CLAIMS

1. A purified nucleic acid molecule comprising at least 200 contiguous nucleotides of a nucleic acid sequence encoding MBD2-CTH1 (SEQ ID NO: 2) or MDB2-CTH2 (SEQ ID NO: 4), or a complementary strand of said nucleic acid sequence.

2. A purified nucleic acid molecule encoding MBD2-CTH1 (SEQ ID NO: 2) or MDB2-CTH2 (SEQ ID NO: 4), or a complementary strand of said nucleic acid sequence.

3. A purified polypeptide comprising at least 67 contiguous amino acids of the amino acid sequence of MBD2-CTH1 (SEQ ID NO: 2) or MDB2-CTH2 (SEQ ID NO: 4).

4. A purified nucleic acid molecule comprising a nucleic acid sequence that encodes the amino acid sequence of MBD2-CTH1 (SEQ ID NO: 2)or MDB2-CTH2 (SEQ ID NO: 4).

5. A method of inhibiting DNA methylation-dependent repression comprising the steps of:

a) contacting a cell with a test molecule, wherein said test molecule comprises an amino acid sequence comprising at least 67 contiguous amino acids of MBD2-CTH1 or MDB2-CTH2, and

b) determining the ability of said test compound to inhibit DNA methylation-dependent repression,

wherein said DNA methylation-dependent repression is mediated by one or more proteins selected form the group consisting of methyled-CpG binding domain proteins and histone deacetylase protein complexes.

6. A method of inhibiting DNA methylation-dependent repression comprising the steps of:

a) contacting a cell with a test molecule, wherein said test molecule comprises an amino acid sequence of MBD2-CTH1 or MDB2-CTH2 and

b) determining the ability of said test compound to inhibit DNA methylation-dependent repression,

wherein said DNA methylation-dependent repression is mediated by one or more proteins selected form the group consisting of methyled-CpG binding domain proteins and histone deacetylase protein complexes.

7. A purified DNA molecule comprising a DNA sequence selected from the group consisting of SEQ ID NO: 1, a complementary strand of SEQ ID NO: 1, SEQ ID NO: 3, and a complementary strand of SEQ ID NO: 3.

8. A method of decreasing the amount of MBD2 protein that can bind a sample of methylated DNA , comprising allowing an effective amount of MBD2-CTH1 peptide to assemble into repressor complexes with a sample of methylated DNA, wherein said MBD2-CTH1 interferes with the ability of an MBD2 protein to form said repressor complexes.